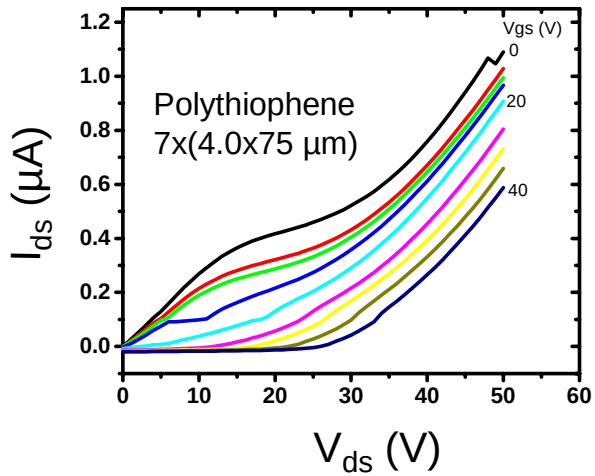
IMR: Acquisition of Equipment for Polymeric Electroactive Materials For Research and Education (DMR- 0196040)

Paul R. Berger, Ohio State University
Mary E. Galvin, University of Delaware

Recent Activities

At Ohio State, **ordering effects on polymer field effect transistors (PFET)** were studied by comparing the performance of PFETs before and after alignment. Heat treatments higher than the glass transition temperature were shown to induce ordering in the active polymer layer by self-assembly to the templated surface below. The mobility of polythiophene FETs before heat treatment is more than twice than that after heat treatment. **The experimental results demonstrated that local order is important for elevated polymer mobility.** ***Shown to the right is a PFET prior to alignment.***



Delaware discovered that **polydispersity in conjugation length, i.e. energetic disorder, can significantly degrade polymer light emitting diode (PLED) efficiency**. By limiting this polydispersity we have been able to increase efficiency in a poly(*p*-phenylenevinylene) single layer PLED (ITO/PPV/AL) by almost 2 orders of magnitude. (accepted for publication in Chemistry of Materials). Prior to this study, researchers had not considered the importance of polydispersity in conjugation length. Our research underlines the importance of controlling this variable, not only for obtaining more efficient devices, but when trying to compare the affect of polymer structure.

National Science Foundation
Celebrating 50 Years

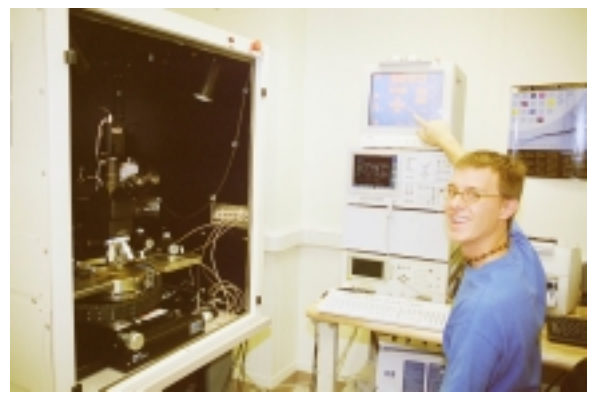
IMR: Acquisition of Equipment for Polymeric Electroactive Materials For Research and Education (DMR- 0196040)

Paul R. Berger, Ohio State University
Mary E. Galvin, University of Delaware

Education, Outreach and Mentoring

Over the duration of this research project at Ohio State, **one female graduate student**. Ms. Yifan Xu, (***pictured left***) and about **six undergraduate students** (***pictured below)*** were involved. Two students were female and one student was African-American. Three of these students are continuing their activities into the 2002-2003 school year, including one woman and an African-American student.

At Delaware, the equipment acquisition has also been used in **outreach activities** and by **local industry (W.L. Gore).** Further, t**wo local high school students** from the Wilmington Charter School have come to the Galvin lab to see how PLEDs were made and tested. Kevin Clough was doing a required senior project on displays and visited the Galvin group to learn more about PLEDs. Emily Peng, who will be attending the University of Pennsylvania as a freshman this year, worked in the Galvin group for 5 weeks this summer.



National Science Foundation
Celebrating 50 Years